

Abstract

Supercapacitors are considered a sustainable, low-cost solution to high-density energy storage. They have extremely fast charging rates, up to 100 times faster than lithium-ion batteries. However, they are limited by their power density and cycle life. In research on Electrochemical Analysis of Manganese Doped $\text{Li}_4\text{Ti}_5\text{O}_{12}$ (Lithium Titanium Oxide or lithium Titanate) Supercapacitors and by UV spectrum, XRD, SEM, and FTIR analysis, it is found that 0.03 and 0.07 Mn-Doped $\text{Li}_4\text{Ti}_5\text{O}_{12}$ has shown better electrochemical properties. This research can be applied in the development of Mn-doped manganese oxide supercapacitors as an alternative energy storage device with higher efficiency than current technologies. Electrochemically less reactive Mn ions offer good reversibility without reducing the electrode potential; Due to improved electronic conductivity after Mn doping, the lattice parameter changes significantly.